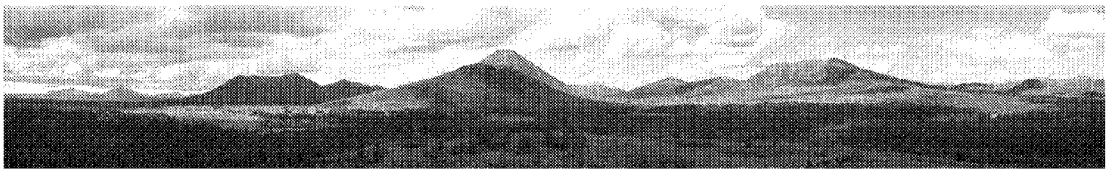

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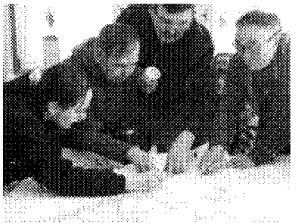
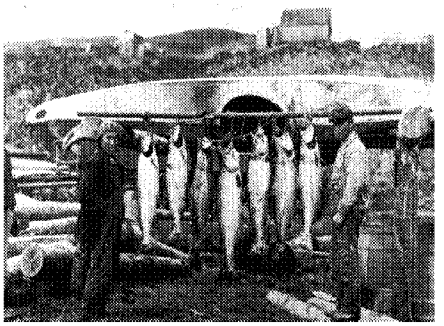
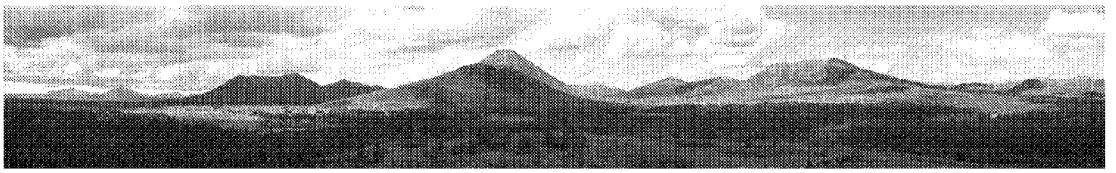
A Science-based Framework for Conservation of Salmon in Bristol Bay, Alaska



David Albert
Director of Conservation Science
The Nature Conservancy, Alaska Field Office

24 September, 2010





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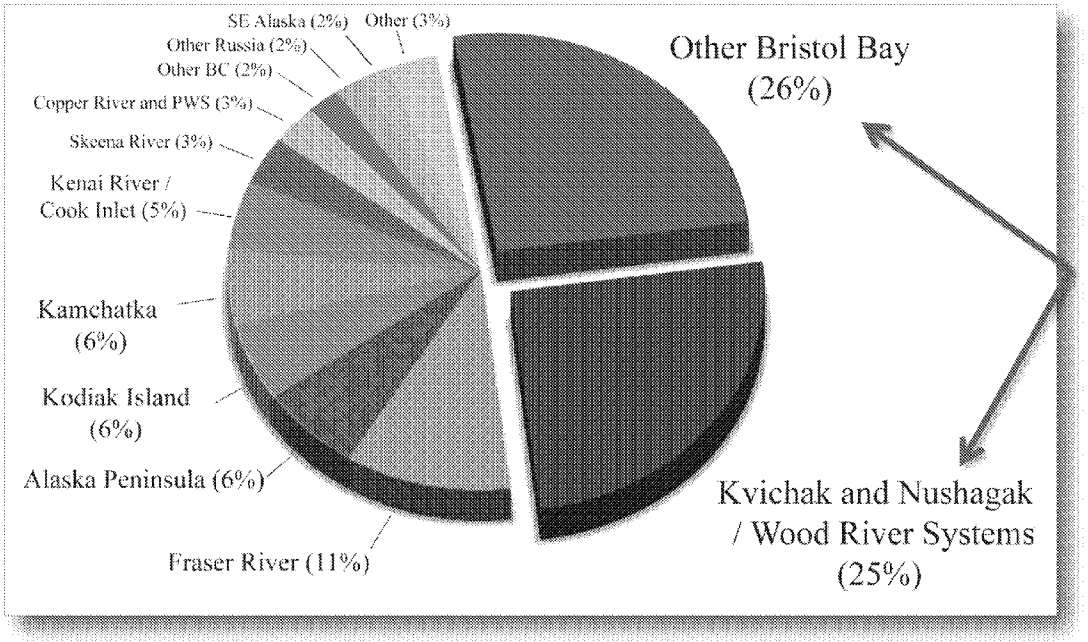
Global Significance:

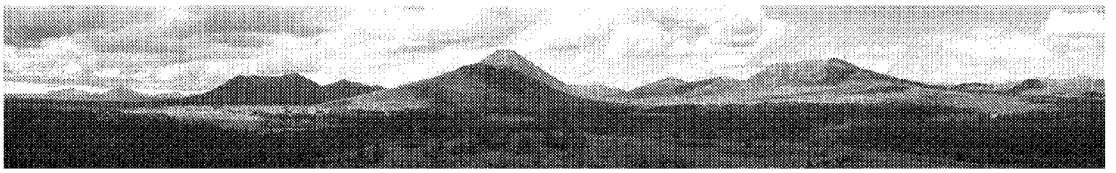
Bristol Bay produces ~51% of all sockeye salmon on earth



51% of all sockeye salmon come from Bristol Bay

From: Ruggerone et al. 2010. Abundance of adult hatchery and wild salmon by region of the North Pacific. Univ. of Washington, School of Aquatic and Fishery Sciences, Report SAFS-UW 1001, Seattle WA.

and Pinsky et al. 2009. Range-wide selection of catchments for Pacific salmon conservation. Conservation Biology (23) 681-691.



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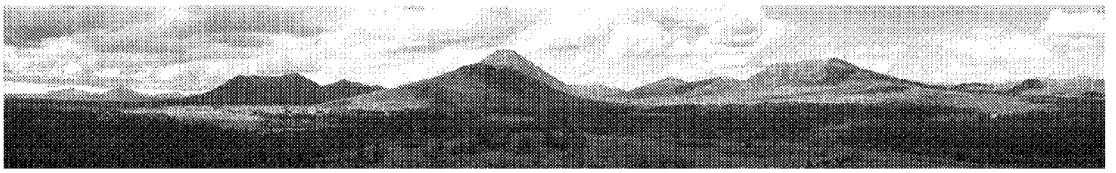
Global Significance:

Bristol Bay also produces:

	51% of all Sockeye salmon
+	4% of all Chinook salmon
+	5% of all Chum salmon
+	3% of all Coho salmon
+	<1% of all Pink salmon
Total:	***10% of all wild salmon on earth***

From: Ruggerone et al. 2010. Abundance of adult hatchery and wild salmon by region of the North Pacific. Univ. of Washington, School of Aquatic and Fishery Sciences, Report SAFS-UW 1001, Seattle WA.



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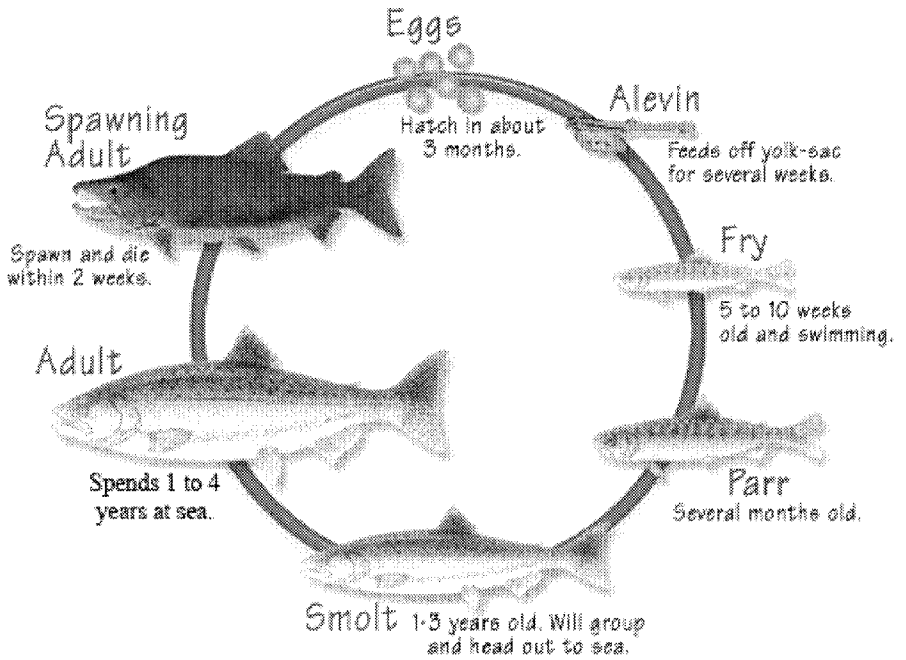
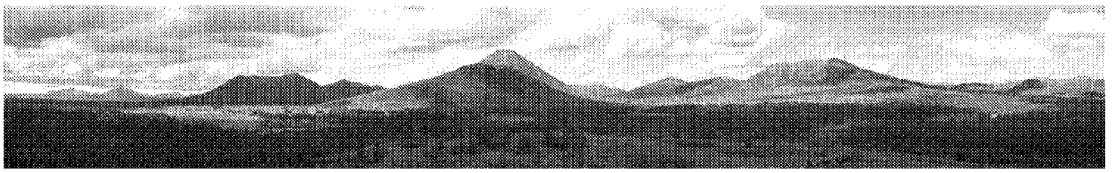
What do salmon need?

- Life history requirements:





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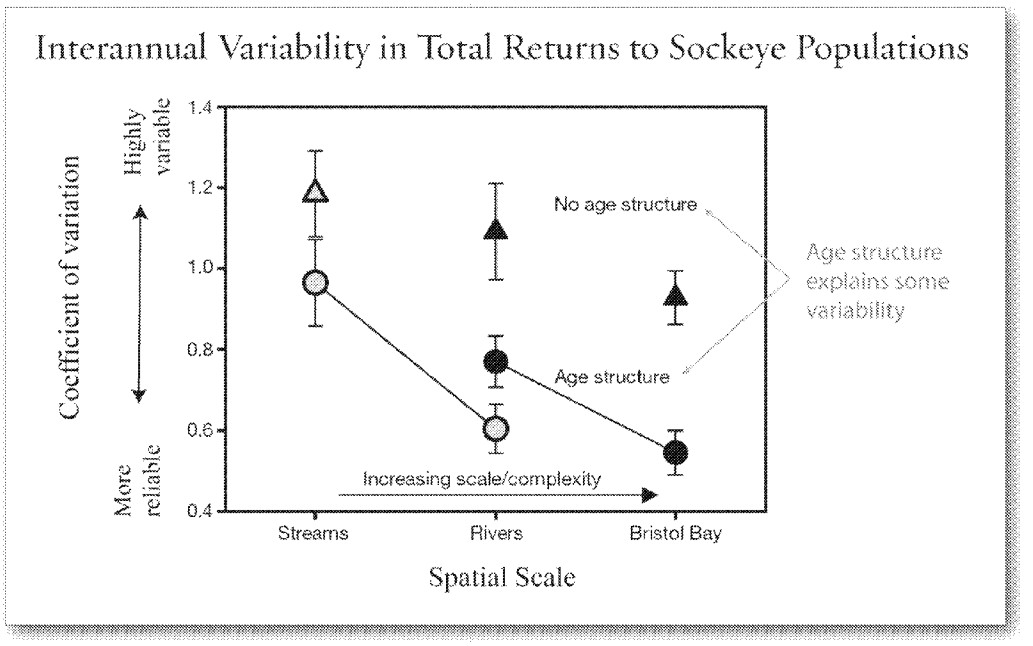
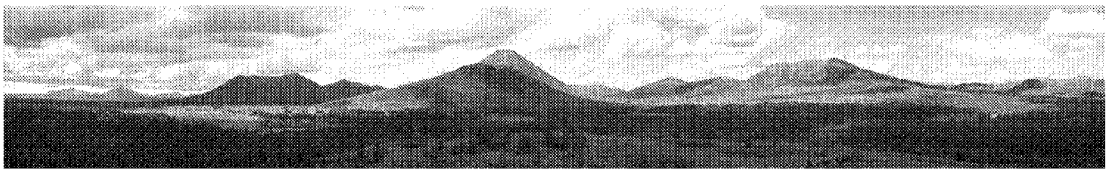
What do salmon need?

- Population diversity and the "portfolio effect"



From: Schindler, et al. 2010. Population stability and the portfolio effect in an exploited species. Nature 635: 609 - 613



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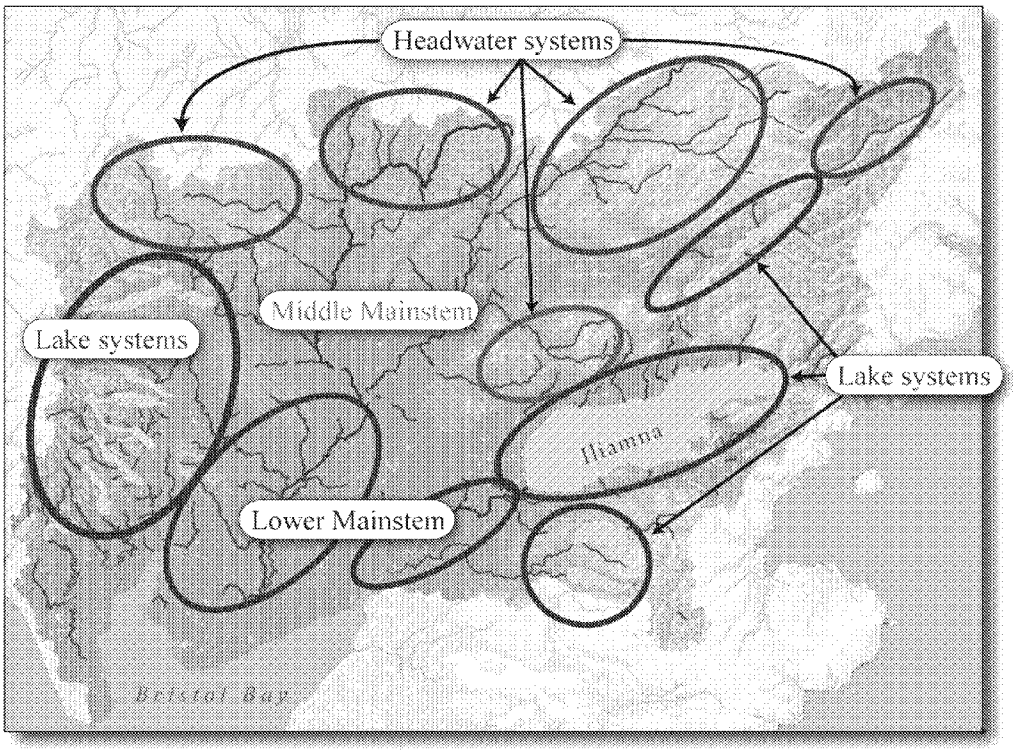

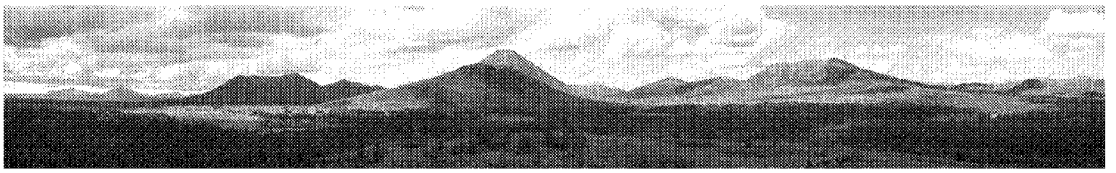

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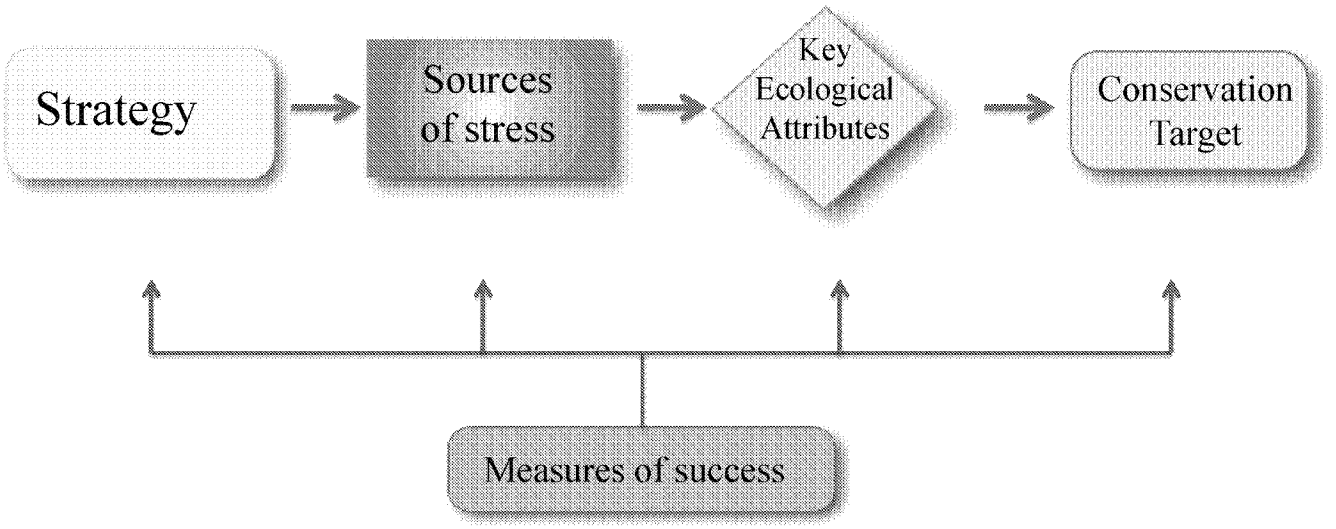
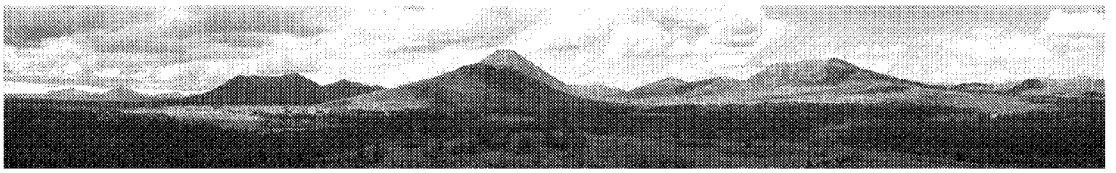
A Conceptual Model for Conservation Planning:



From TNC (2007): A Conservation Action Planning Handbook: Developing Strategies, Taking Actions and Measuring Success at any Scale. The Nature Conservancy, Arlington VA. 129 pp.



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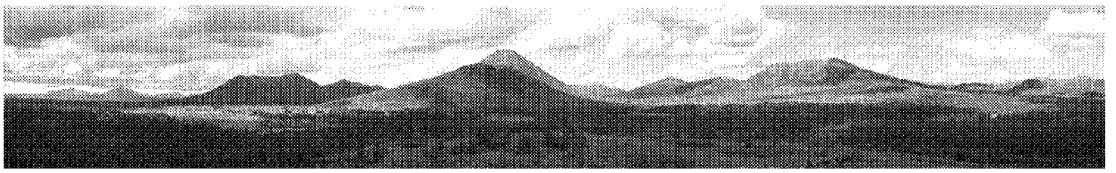
Sources of Stress	Ecological Attributes	Life History Requirements
Risks to key ecological attributes associated with large-scale mining	*Physical and biological functions necessary to maintain viability of each salmon life stage*	*Life stages representing "links in a chain" are essential for successful conservation of salmon*
		Eggs (embryonic development)
		Alevin (pre-emergence)
		Fry (emergence)
		Parr (freshwater rearing)
		Smolt (out migration)
		Spawning Adult (return and spawning)



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Sources of Stress

Ecological Attributes

Physical and biological functions necessary to maintain viability of each salmon life stage

Life History Requirements

Life stages representing "links in a chain" are essential for successful conservation of salmon

Instream flow

Gravel quality

Water temperature and Dissolved oxygen

Groundwater inflow

Water quality (pH, turbidity, metals)

Eggs (embryonic development)

Alevin (pre-emergence)

Fry

Parr

Smolt

Spawning Adult

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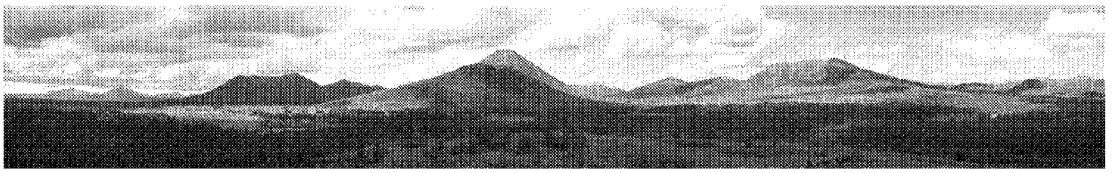

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Sources of Stress

Ecological Attributes

Physical and biological functions necessary to maintain viability of each salmon life stage

Life History Requirements

Life stages representing "links in a chain" are essential for successful conservation of salmon

Instream flow

Water temperature and Dissolved oxygen

Groundwater inflow

Instream habitat (depth, cover, substrate)

Water quality (pH, turbidity, metals)

Aquatic insects

Riparian vegetation

Connectivity

Fry (emergence)

Parr (freshwater rearing)

Smolt (out migration)

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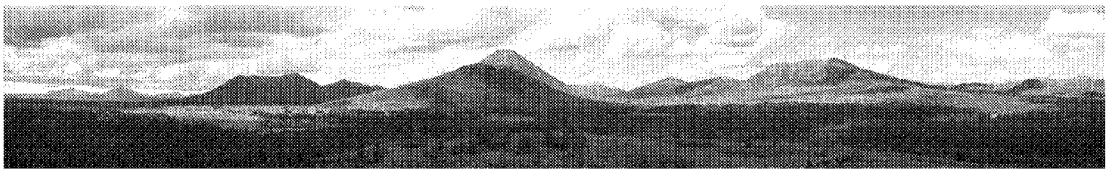

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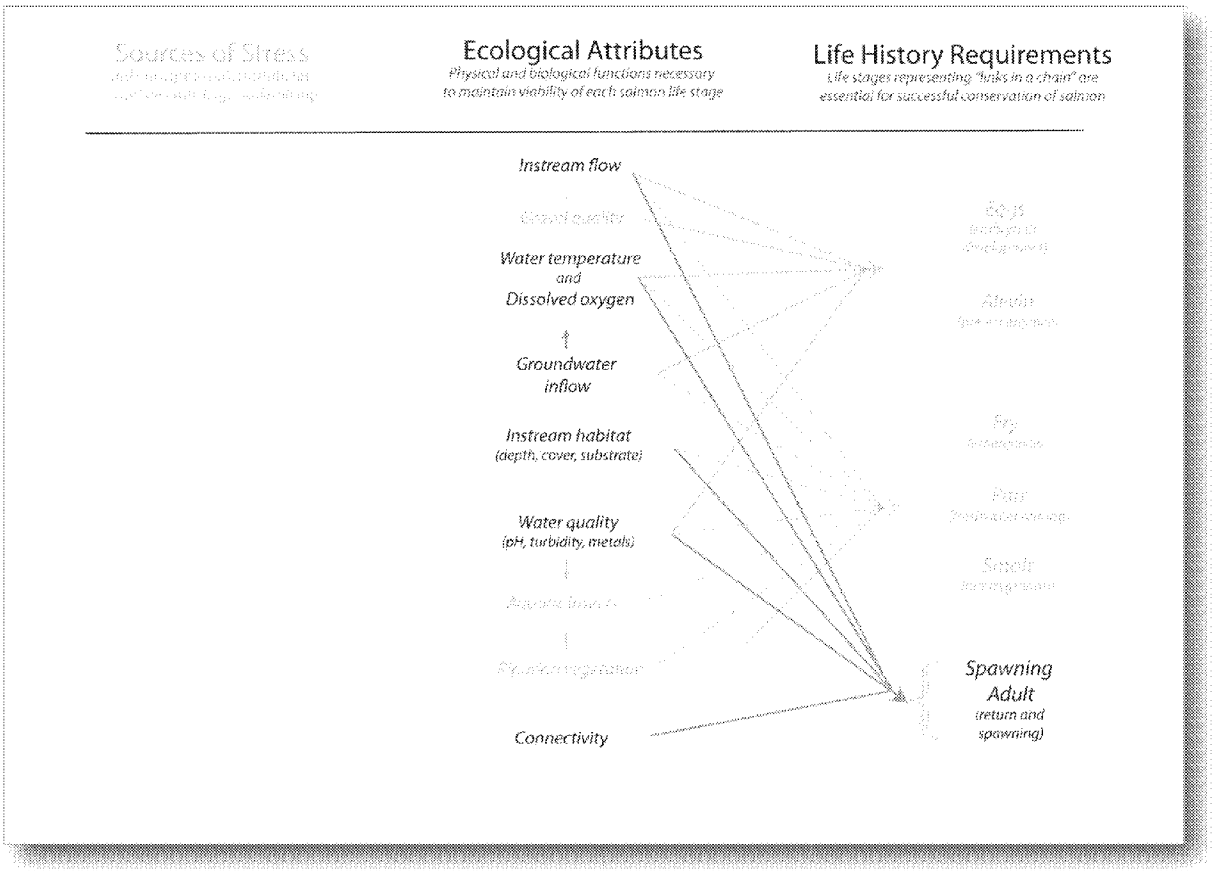

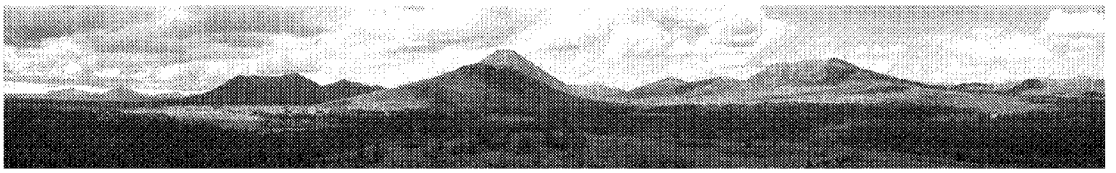

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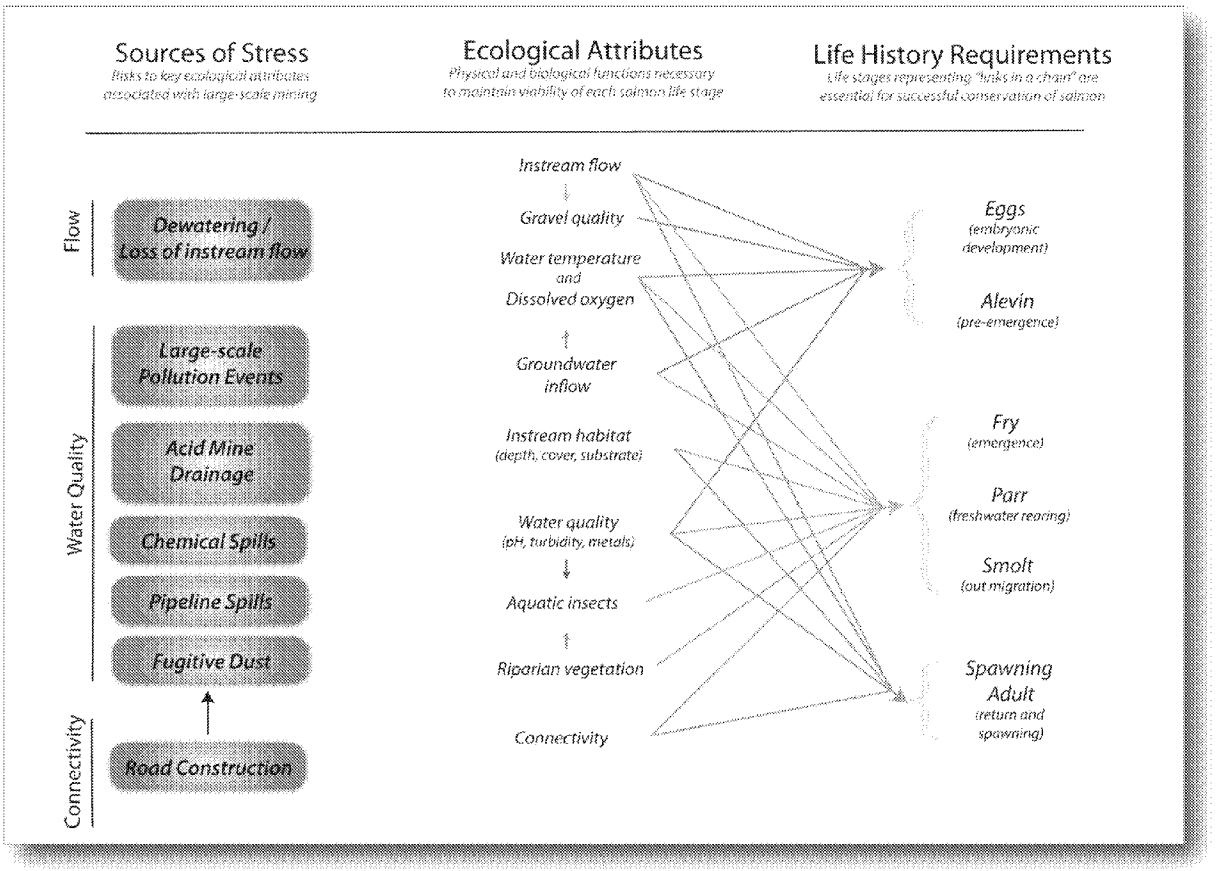

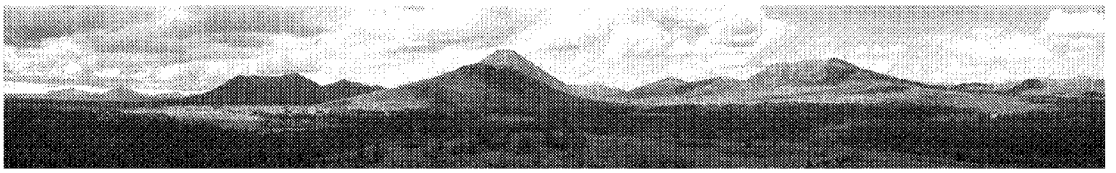

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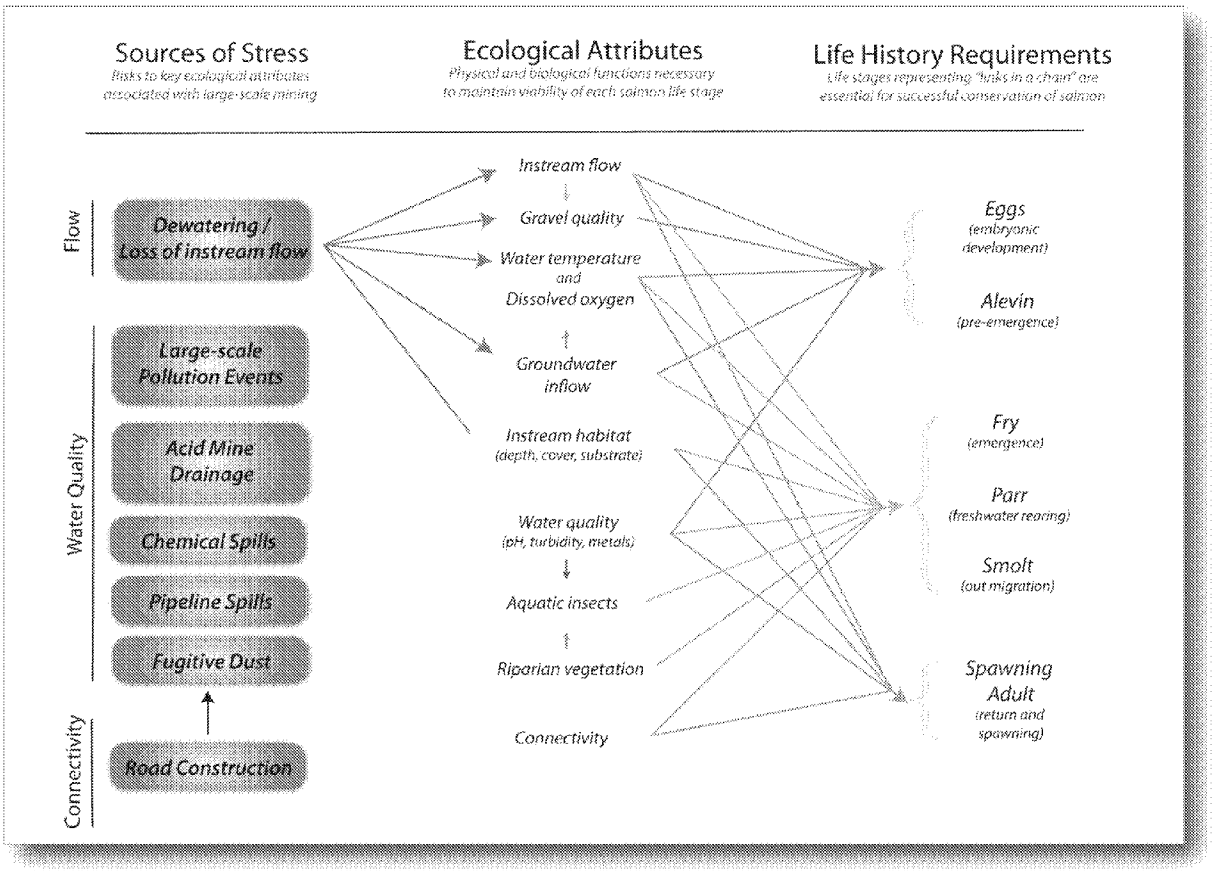

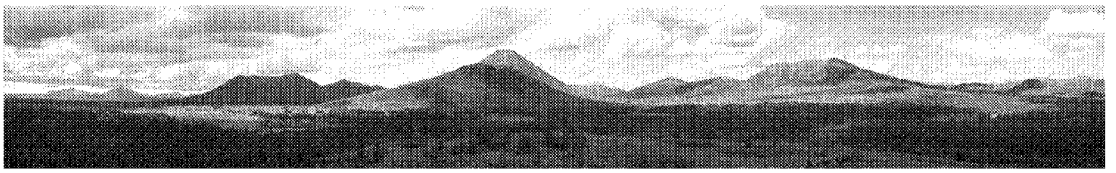

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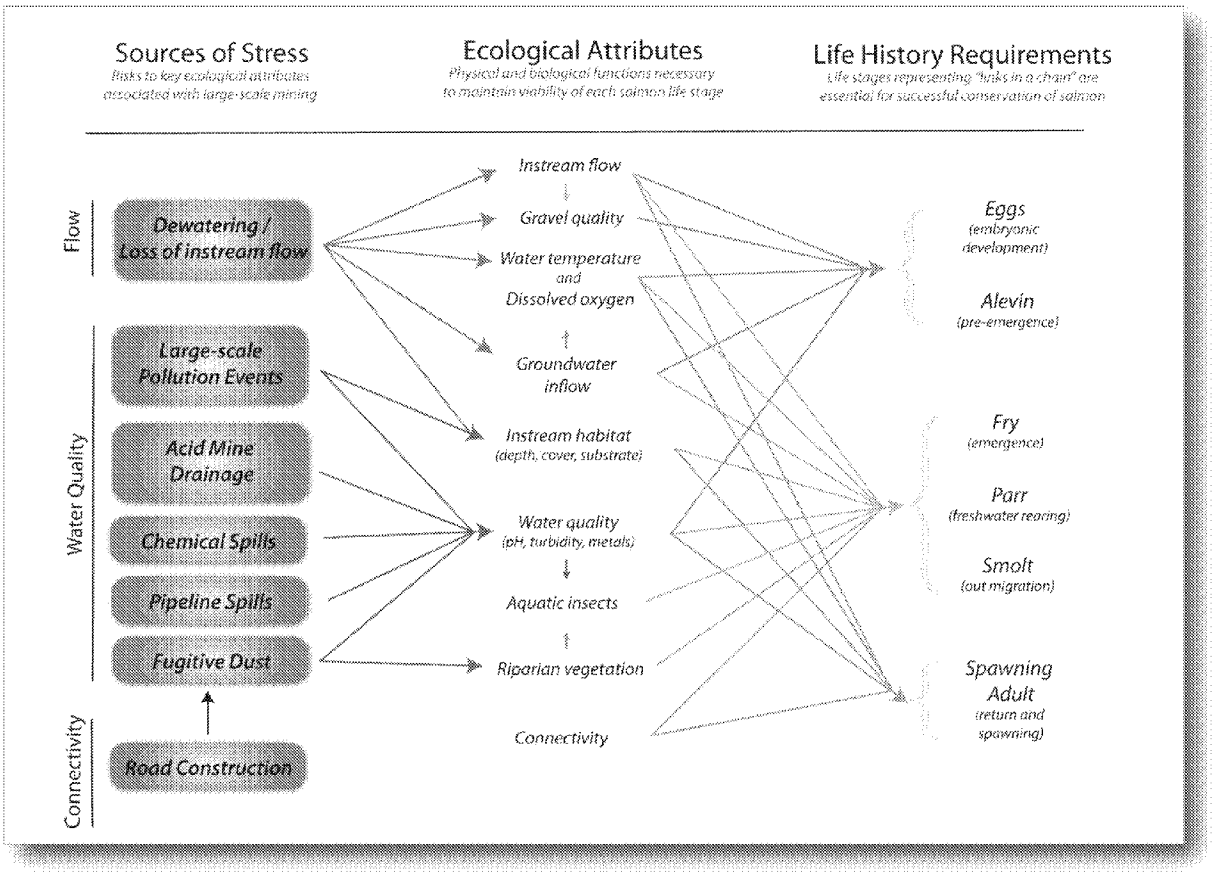

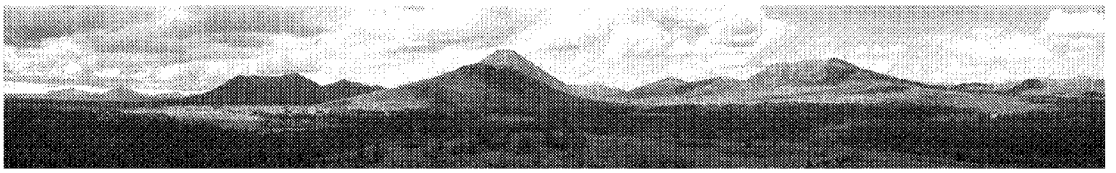

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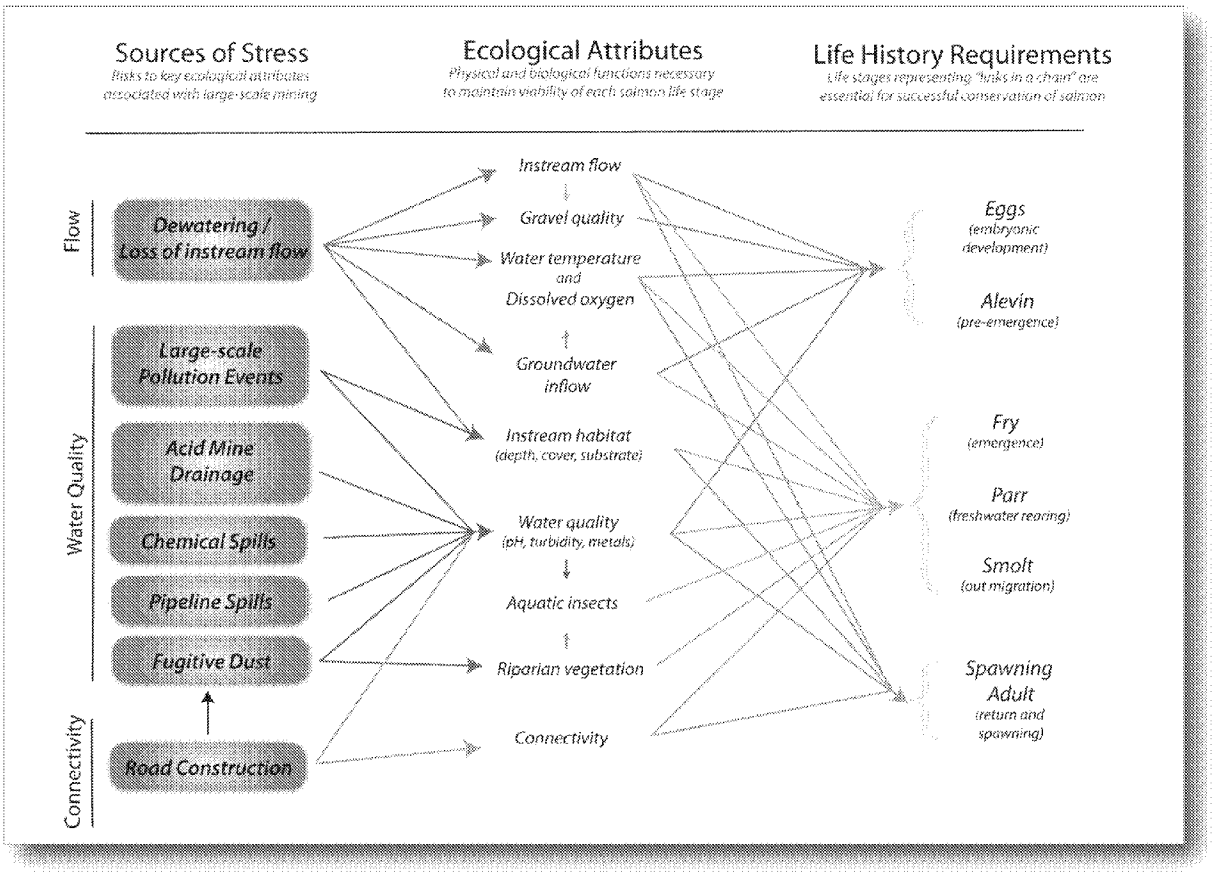

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